Printed and Flexible Electronics Services: Development and optimization of materials and devices

Targeted primarily at suppliers and developers of substrate materials and printable semiconductors, dielectrics and metals, this suite of services provides development and optimization of materials and devices for many applications such as displays, sensing and processing.

OVERVIEW: Printing optimization

Obtaining uniform, continuous and high-quality printed features is key to reliable electronic properties and consistent device performance. Ink formulation tuning and surface treatment protocols (to create hydrophilic or hydrophobic surfaces) are used to optimize printed feature size and device geometry.

Performance in devices

PARC uses client-supplied materials, combined as needed with substrates or materials from other suppliers, to fabricate devices and optimize and characterize their performance. Typical devices fabricated include Thin-film Transistors (TFTs), mechanical sensors and thin-film sensors such as photodiodes. Current Voltage (IV) characteristics and bias-stress measurements are used to optimize contact and interface properties, feeding back as necessary to printing and materials optimization.
Performance in circuits
Fabricating devices in circuits, e.g., active-matrix arrays for display or sensing applications, or shift registers or ring oscillators for processing applications, provides crucial data on device uniformity and drive capability. PARC can both characterize circuit performance and deliver sample circuits for clients’ own testing.

Correlation of electrical and physical properties, e.g., surface roughness, interface formation
Using electrical measurements and physical imaging techniques, including AFM, cross-section SEM, TEM, etc., issues with device performance can be tracked down to specific material properties or structural defects.

Benchmarking of material properties against state-of-the-art industry standards
PARC works with a wide range of materials from current and prospective suppliers to the printed electronics industry. PARC can provide confidential feedback to clients on how their materials compare to the current publicly disclosed state of the art using closely matched device fabrication and testing protocols.

Equipment:
- Custom printers with placement precision better than 5 um. Different print head technologies can be introduced in our systems. Current systems working with Microfab, Spectra and Xerox print heads. Substrates up to 15” square.
- Single-nozzle printer designed for ink development: controlled environment, solution heating options for lower solubility materials.

More Information
Business Development
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